

Confirmation No. 6441

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	WANG	Examiner:	Le, D.
Serial No.:	10/526,194	Group Art Unit:	2816
Filed:	March 1, 2005	Docket No.:	CH020032US
Title:	SELF-CALIBRATION OF CONTINUOUS-TIME FILTERS AND SYSTEMS COMPRISING SUCH FILTERS		

APPEAL BRIEF

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Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Customer No. 65913

Dear Sir:

This Appeal Brief is submitted pursuant to 37 C.F.R. §41.37, in support of the Notice of Appeal filed January 4, 2007 and in response to the rejections of claims 1-7, 9-10 and 12-17 as set forth in the Final Office Action dated October 17, 2007, and in further response to the Advisory Action dated December 7, 2007.

Please charge Deposit Account number 50-0996 (NXPS.262PA) \$510.00 for filing this brief in support of an appeal as set forth in 37 C.F.R. §1.17(c). If necessary, authority is given to charge/credit Deposit Account 50-0996 additional fees/overages in support of this filing.

I. Real Party In Interest

The real party in interest is NXP Semiconductors. The application is presently assigned of record, at reel/frame nos. 016806/0525 to Koninklijke Philips Electronics, N.V., headquartered in Eindhoven, the Netherlands. We have been authorized by both the assignee of record and NXP Semiconductors to convey herein that the entire right, title and interest of the instant patent application has been transferred to NXP Semiconductors.

II. Related Appeals and Interferences

While Appellant is aware of other pending applications owned by the above-identified Assignee, Appellant is unaware of any related appeals, interferences or judicial proceedings that would have a bearing on the Board's decision in the instant appeal.

III. Status of Claims

Claims 1-7, 9-10 and 12-15 stand rejected and are presented for appeal. A complete listing of the claims under appeal is provided in an Appendix to this Brief.

Claims 8 and 11 have been cancelled, and do not form part of this appeal.

Claims 16 and 17 were indicated as allowed in the Final Office Action dated October 17, 2007, and thus do not form part of this appeal.

IV. Status of Amendments

No amendments have been filed subsequent to the Office Action dated October 17, 2007.

V. Summary of Claimed Subject Matter

Appellant's recited invention relates to a continuous-time filter system that self-calibrates.

Commensurate with independent claim 1, an example embodiment of the present invention is directed to a continuous-time filter system that includes a master control unit (*see, e.g.*, master control unit 36 shown in Fig. 3, along with discussions on page 6:20-29 and page 8:3-21) and a slave unit with at least one slave filter (*see, e.g.*, slave filters 27.1-27.5 shown in Fig. 3, along with discussions on page 6:20-29 and page 8:3-21).

Commensurate with this example embodiment, the master control unit includes an integrator (*see, e.g.*, integrator 30 shown in Fig. 3, along with discussions on page 6:20-29 and page 8:3-21) having a transconductor (*see, e.g.*, transconductor 33 shown in Fig. 3, along with discussions on page 6:20-29) and a capacitor (*see, e.g.*, capacitor C shown in Fig. 3, along with discussions on page 6:20-29 and) which match those elements of the slave filter that define a time constant of the slave filter (*see, e.g.*, discussions on page 8:3-21), a voltage comparator (*see, e.g.*, voltage comparator 35 shown in Fig. 3, along with discussions on page 8:3-21) connected to a variable threshold voltage (*see, e.g.*, V_{th} shown in Fig. 3) and to an output of the integrator (*see, e.g.*, Fig. 3, along with discussions on page 8:3-21), the voltage comparator providing an output frequency signal (*see, e.g.*, f_{com} shown in Fig. 3, along with discussions on page 8:3-21), and a phase frequency comparator (*see, e.g.*, PFC 28 shown in Figs. 3 and 5, along with discussions on page 8:3-21 and on page 8:30 through page 9:11) providing a control signal as an output signal (*see, e.g.*, control signal v shown in Fig. 3, along with discussions on page 8:3-21), the phase frequency comparator receiving said output frequency signal and a reference frequency signal as input signals (*see, e.g.*, reference frequency signal f_{ref} shown in Fig. 3, along with discussions on page 8:3-21). Commensurate with this example embodiment, the slave unit includes the at least one slave filter that uses the control signal to influence the slave filter's time constant (*see, e.g.*, discussions on page 8:3-21) and therein facilitate calibration of a transfer function of the slave filter (*see, e.g.*, discussions on page 8:3-21).

As required by 37 C.F.R. § 41.37(c)(1)(v), a concise explanation of the subject matter defined in the independent claims involved in the appeal is provided herein. Appellant notes that representative subject matter is identified for these claims; however, the abundance of supporting subject matter in the application prohibits identifying all textual and diagrammatic references to each claimed recitation. Appellant thus submits that other application subject matter, which supports the claims but is not specifically identified above, may be found elsewhere in the application. Appellant further notes that this summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

VI. Grounds of Rejection to be Reviewed Upon Appeal

A. Claims 1, 3-7, 9 and 14-15 stand rejected under 35 U.S.C. § 103(a) over Tamba (U.S. Patent No. 5,594,383) in view of Kimura *et al.* (U.S. Patent No. 6,326,838).

B. Claims 2, 10 and 12-13 stand rejected under 35 U.S.C. § 103(a) over Tamba in view of Kimura and further in view of Petersen *et al.* (U.S. Patent No. 5,325,317).

VII. Argument

Appellant submits that the § 103(a) rejections of claims 1-7, 9-10 and 12-15 should be reversed because the proposed combinations do not correspond to the claimed invention, because the proposed modifications undermine the principles of operation as taught in the primary Tamba reference, and because the Examiner failed to present a valid reason for the proposed modifications. A purported obviousness rejection based on a combination of references fails unless the references are properly combinable and teach or suggest all the recited claim elements. Without a reasonable expectation of success and a valid reason for combining, references are not properly combinable. These conditions cannot be satisfied when a reference teaches away from the proposed combination or modification, or when a reference is rendered inoperable for its intended purpose upon making the proposed combination or modification. Appellant submits that the Examiner's obviousness rejection fails to meet the required criteria, and therefore Appellant requests that the Board reverse.

A. The rejection of claims 1, 3-7, 9 and 14-15 under 35 U.S.C. § 103(a) over Tamba in view of Kimura is improper and should be reversed.

Appellant's invention relates to self-calibration of continuous time filters. Appellant recognized that conventional approaches for calibrating continuous time filters rely on the transconductors and capacitors of both the master and slave being perfectly matched so that tuning of the master control block results in a properly tuned slave filter.

Understanding that tuning precision in these conventional approaches can suffer due to internal mismatches between master and slave components, Appellant teaches independent tuning of the slave filter time constant to facilitate improved calibration.

Appellant submits that the § 103(a) rejection of claims 1, 3-7, 9 and 14-15 fails because the neither the Tamba reference nor the Kimura reference teaches or suggests calibration of continuous-time filters in the manner recited in the claimed invention. In fact, the Examiner does not provide any correspondence for using the control signal to influence the time constant of the slave filter to thereby facilitate calibration of a transfer function of the slave filter. This is unsurprising given that Appellant is unable to find any mention of calibration at all in the cited references. Moreover, the references do not appear to discuss any implementations that could be construed as the type of calibration recited in Appellant's claims. For example, Appellant's Specification includes supporting example implementations directed to varying a threshold voltage, varying the input voltage of an integrator, and varying the frequency of a clock signal, none of which have corresponding teachings in the applied references. Appellant submits that to the extent that any correspondence has been asserted between the cited references and the claimed aspects directed to calibrating continuous-time filters, the Examiner has improperly used hindsight reconstruction based upon Appellant's own teachings. *See, e.g., M.P.E.P. § 2142.*

Appellant further submits that the § 103(a) rejection fails because the Examiner's asserted modification undermines the operation of the Tamba reference. As indicated in M.P.E.P. § 2143.01, when the asserted modification would undermine both the operation and the purpose of the main reference, the §103 rejection is improper. *See also In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984) (A §103 rejection cannot be maintained when the asserted modification undermines the operation and/or purpose of main reference.).

The Examiner proposes changing the Tamba circuit so that it uses a different reference voltage (*i.e.*, other than ground); however, such a modification would change the comparison performed by parallel-operating operational amplifiers (or comparators) 31 and 32 of Tamba's Figure 10, thereby adversely altering the output of the phase detect circuit 30 and resulting in an inability to synchronize to the input signal of the receiver. As indicated at Column 11 of Tamba, the purpose of this embodiment (shown in Figures

9 and 10) is to precisely detect the phase difference for the feedback and overall operation of the receiver circuit. The Examiner's proposed modification is therefore improper in that it would result in the Tamba circuit failing to operate according to its intended purpose and failing to operate generally.

Moreover, the Examiner fails to present a valid reason for the proposed modification of the Tamba reference. Under the recent USPTO guidelines (based on the recent U.S. Supreme Court decision as to teaching/suggestion/motivation under §103), for a rejection to be maintained under §103, the rejection must present some proper reason why a skilled artisan would change the main reference as proposed by the Examiner. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (U.S. 2007) ("A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art.") *See also* numerous USPTO Appeal board decisions that have cited the Supreme Court's decision as support for overturning Examiners' rejections for lack of adequate rationale to combine.

The Examiner acknowledged that Tamba's comparator 31 uses a fixed reference voltage (*i.e.*, ground); however the Examiner asserts that it would be obvious to incorporate the variable threshold as suggested by Kimura into the circuit of Tamba "for the purpose of tuning the plurality of transconductance amplifiers of the slave filter with high-precision and for reducing size and power consumption." *See, e.g.*, Final Office Action page 2, last line to page 3, line 8. Appellant submits that it is illogical for the Examiner to assert that a reduction in the size and power consumption of Tamba's circuit would be expected to result from replacing the ground connection of Tamba's comparator 32 (*see e.g.*, Tamba Figure 10) with Kimura's reference voltage source (25-28), switch 42 and selector 44 (*see e.g.*, Kimura Figure 1). One of skill in the art would readily appreciate that incorporating Kimura's reference voltage source (25-28), switch 42 and selector 44 into Tamba's circuit would increase both the size and power consumption of Tamba's circuit relative to a simple ground connection. As such, the Examiner's purported reasoning fails.

Furthermore, the Kimura reference teaches controlling the transconductance (50-53) of each transconductance amplifier using selector 40 and switch 43 (*see e.g.*, Kimura Figure 1), while Tamba's filter 10 is not shown as having a plurality of transconductance amplifiers or any corresponding selector and switch that would indicate the capability of

controlling a plurality of transconductance amplifiers (*see e.g.*, Tamba Figure 10). Appellant submits that one of skill in the art would find no reason to modify Tamba's circuit to control a nonexistent plurality of transconductance amplifiers. Again, the Examiner appears to be improperly resorting to hindsight reconstruction based upon Appellant's disclosure in an attempt to arrive at a combination that corresponds to the claimed invention. *See, e.g.*, M.P.E.P. § 2142.

Appellant further submits that the § 103(a) rejection as applied to claims 6 and 7 is improper for the additional reason that the Examiner failed to cite to any portion of the Tamba and Kimura references that would correspond aspects recited in these claims. Regarding claim 6, the Examiner failed to cite to any portion of Tamba or Kimura as corresponding to aspects directed to the phase frequency comparator including a loop filter and a phase frequency detector situated in front of the loop filter. Regarding claim 6, the Examiner failed to cite to any portion of Tamba or Kimura as corresponding to aspects directed to the master control unit including a switch.

For at least these reasons, Appellant requests that the Board reverse the § 103(a) rejection of claims 1, 3-7, 9 and 14-15.

B. The rejection of claims 2, 10 and 12-13 under 35 U.S.C. § 103(a) over Tamba in view of Kimura and further in view of Petersen is improper and should be reversed.

Appellant respectfully submits that the § 103(a) rejection of claims 2, 10 and 12-13 fails for the same reasons discussed above, namely that none of the cited references (included the added Petersen reference) teaches or suggests the claimed facilitation of calibration, that the proposed underlying modifications of the Tamba reference would render the device of Tamba inoperable for its intended purpose, and that no valid reason has been presented to support the proposed modifications of the Tamba reference. Appellant submits that the addition of the Petersen reference provides nothing that would overcome the above-discussed deficiencies.

For at least these reasons, Appellant requests that the Board reverse the § 103(a) rejection of claims 2, 10 and 12-13.

C. The finality of the Final Office Action was improper because the Examiner introduced a new ground of rejection that was not necessitated by Appellant's amendment or based on information submitted in an IDS.

Appellant submits that Examiner improperly made final the Office Action mailed October 17, 2007. As consistent with M.P.E.P. § 706.07(a), second actions should not be final where the Examiner introduces a new ground of rejection that is neither necessitated by Appellant's amendment of the claims nor based on information submitted in an information disclosure statement. In the prosecution of the present application, the claim rejections presented in the Office Action mailed October 17, 2007 were new, relying upon Tamba as the primary reference modified by Kimura. Appellant's claim amendments filed July 27, 2007 did necessitate this new rejection as the aspects directed to the variable threshold voltage were already present. Also, the Kimura reference was not submitted in an information disclosure statement. Appellant submits that a final rejection also would not have been appropriate in response to the RCE filed March 6, 2007. Thus, it is inappropriate for the Examiner to present a new rejection in the form of a final rejection in order to address aspects of the claimed invention directed to the variable threshold voltage at this time. Accordingly to M.P.E.P. § 706.07, "The examiner should never lose sight of the fact that in every case the applicant is entitled to a full and fair hearing, and that a clear issue between applicant and examiner should be developed, if possible, before appeal." Appellant therefore requests that the Board remove the finality of the Office Action mailed October 17, 2007 so that Appellant may be afforded the opportunity to respond to any remaining rejections by way of a new Office Action.

VIII. Conclusion

In view of the above, Appellant submits that the rejections of claims 1-7, 9-10 and 12-17 are improper. Appellant therefore requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Authority to charge the undersigned's deposit account was provided on the first page of this brief.

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APPENDIX OF CLAIMS INVOLVED IN THE APPEAL
(S/N 10/526,194)

1. A continuous-time filter system comprising:
a master control unit and a slave unit with at least one slave filter, the master control unit including
an integrator having a transconductor and a capacitor which match those elements of the slave filter that define a time constant of the slave filter,
a voltage comparator connected to a variable threshold voltage and to an output of the integrator, the voltage comparator providing an output frequency signal, and
a phase frequency comparator providing a control signal as an output signal, the phase frequency comparator receiving said output frequency signal and a reference frequency signal as input signals; and
the slave unit including said at least one slave filter that uses the control signal to influence the slave filter's time constant and therein facilitate calibration of a transfer function of the slave filter.
2. The system of claim 1, wherein the slave filter is an RC-filter and the control signal is a discrete signal leading to a calibration of the slave filter's transfer function in steps.
3. The system of claim 1, wherein the slave filter is a continuous-time Gm-C-filter and the control signal is a continuous signal.
4. The system of claim 1, wherein the slave filter is an integrated filter.
5. The system of claim 1, wherein the master control unit comprises one transconductor and one capacitor only.
6. The system of one claim 1, wherein the phase frequency comparator comprises:
a loop filter providing the control signal as output signal,

a phase frequency detector situated in front of the loop filter, the phase frequency detector receiving said output frequency signal and a reference frequency signal as input signals, and

an error signal representing the phase difference between the output frequency signal and the reference frequency signal being fed by the phase frequency detector to the loop filter.

7. The system of claim 1, wherein the master control unit comprises a switch being controllable by a signal.

9. The system of claim 1, wherein a DC voltage is applied to an input of the integrator.

10. The system of claim 1, wherein the integrator has a transconductance that can be tuned by varying

a threshold voltage being applied to an input of the voltage comparator, and/or

a DC voltage being applied to an input of the integrator, and/or

the frequency of a clock signal.

12. The system of claim 1, wherein the integrator has a transconductance that can be tuned by varying a DC voltage being applied to an input of the integrator while keeping a threshold voltage being applied to an input of the voltage comparator and the reference frequency signal unchanged.

13. The system of claim 1, wherein the integrator has a transconductance that can be tuned by varying a threshold voltage being applied to an input of the voltage comparator while keeping a DC voltage being applied to an input of the integrator and the reference frequency signal unchanged.

14. The system of claim 1, wherein the transconductor comprises a voltage-to-current converter that includes a programmable resistor array or a programmable capacitor array.

15. The system of claim 1, further embodied in a telecommunication system, video-signal processing system, or disk driver system.

APPENDIX OF EVIDENCE

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.

APPENDIX OF RELATED PROCEEDINGS

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.